

156314
3-11-83

CEA 3805, MAIN SOUTH
TRUNK SEWER, WQK

W.C. ENGMAN 1740
E.J. FORNERZIS 1740
K.W. LICHTENHELD CS7L
R.L. NELSON 1740
T.G. O'CONNEL CS7V
C.R. STEIB CS7L
J.W. DEMMITT CS6M

ATTACHED IS THE LATEST REVISION OF THE PDR,
TO REFLECT TRANT RESPONSIBILITY FOR OPERATION
OF THE DEWATERING PUMPS. THE COST ESTIMATE
WILL BE REVISED TO \$500K (STEIB). THE
PRELIMINARY MASTER PROJECT SCHEDULE WILL
BE DEVELOPED BY DEMMITT (JOHN, SEE ME ON
INFO FROM DESIGN/CONSTRUCT QUOTES).

ALL OTHERS PLEASE GET YOUR COMMENTS TO
ME BY 3-18-83 (ENGMAN ASAP AFTER VACATION).
THIS VERSION IS GOING INTO THE WANG TODAY.

I'D LIKE TO HAVE THE STRATEGY MEETING
BY 3-25-83 (ENGMAN'S INPUTS ARE KEY TO THIS
DATE).

THANKS!

BRYAN SEVER

WQK 4084949

Appropriation Project Definition Report

CEA 3808

Main South Trunk Sewer

Monsanto Chemical Intermediates Company

WG Krummrich Plant

March 23, 1983
August 4, 1982

Approved By

B. J. Sevey
Project Manager

R. L. Wiese
Manager, ~~MCI~~ Engineering
MIC

R. L. Nelson
Manufacturing Representative

W. L. Smull
General Superintendent, TSD.

WGK 4084950

CEA 3808

MAIN SOUTH TRUNK SEWER

APPROPRIATION
PROJECT DEFINITION REPORT

DISTRIBUTION

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V.T. MATTEUCCI BZSC
M.R. FORSMAN G4WA

W6K 4084951

CEA 3808 - MAIN SOUTH SEWER

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NGK 4084952

I. Project Synopsis

This project will provide a new 42 inch diameter, Monsanto owned, trunk sewer to carry all the plant sewer load now carried by the two Sauget Village sewers. The two existing village sewers are in a very deteriorated condition due to the high acidity of the plant wastes, and require extensive repairs. Repair of the village sewers will be the responsibility of the village.

The new sewer will combine most plant sewer loads into one discharge point where sampling and measuring devices will be provided. The exceptions are sulfuric acid manufacturing, the laboratory and Lot A which discharge into the village sewer on the north side of the plant. The existing south plant sewer system has about nineteen discharge points into the village sewer.

II. Project Results and Commitments

A. Project Results Statements and Priorities

The major result to be realized from this project is to provide a reliable acid proof sewer to handle the plant sanitary, storm and process discharges. This will isolate Monsanto's discharges from the other industrial and residential area wastes and provide a single Monsanto discharge which will be monitored.

During project execution cost will be of first priority over improved project timing. Careful planning is required to minimize impact on plant production and maintenance.

B. Products, Capacity and Raw Materials

1. Products - Not applicable.
2. Capacity - The existing South Trunk Sewers are discharging approximately 27 cfs (12,000 GPM) flowing full. These sewers carry approximately 95% of the main plant discharge.

HGK 4084953

II. Project Results and Commitments - continued

The new South Trunk Sewer is planned to be ~~42~~ ⁴⁸ ~~in~~ ⁱⁿ ~~ø~~ ^ø diameter and has a theoretical capacity of 45 cfs (20,000 GPM) at 0.2% slope. For a flat site, such as the W. G. Krummrich Plant, it ~~could~~ ^{can} be assumed that as much as an inch of rain accumulates before runoff ~~would~~ begins. On this basis, the 42 inch sewer would have sufficient capacity to handle a 5 year frequency storm with a 15 minute duration.

The village system downstream from Monsanto's discharge consists of a 42" ø sewer under Route 3 and two (2) 36" ø sewers from west of Route 3 to the treatment plant.

The flume will be designed to accurately measure flows between 3000 and 8,000 GPM.

3. Raw Materials - Not applicable.

C. Manning, Operability and Maintainability

Sewer construction will be aimed at minimizing ITS maintenance. The sewer will be extra strength vitrified clay tile encased in reinforced concrete to maintain the integrity of the furan resin acid proof joint cement. Manholes will be reinforced concrete with acid proof brick lining. Manholes will be provided at each direction change to provide for easy inspection and cleaning.

Plant ^{OPERATING} manpower will not be effected by this project.

D. Utilities and Energy Conservation

The ~~only~~ utility requirements for this project is electrical power used for heating, ventilating and lighting the sampling house and operating the sampler (Approximately 5kw maximum), AND POWER TO OPERATE DEEP WELL Dewatering Pumps (ABOUT 4 PUMPS AT 25HP EACH).
"Product Energy Rate" does not apply to this project.

"Energy and Utility Costs for Evaluating Project Capital Alternates" do not apply to this project.

Plant Maintenance personnel will be required to maintain the deep well dewatering pumps and controls, and they will need to move pumps from deep well to deep well as sewer construction progresses.

WCK 4084954

II. Project Results and Commitments - continued

E. Control of Hazards and Environment

1. Control of Hazards

No new hazards are associated with this project. The composition of the plant effluents are not changed by this project. Prevention of explosive mixtures in the sewer vapor space is currently accomplished at the points of entrance into the plant sewer system and is unchanged by this project.

2. Employee Exposure to Hazardous Materials

This project will not change employee exposure. The sample house will be provided with forced ventilation for use when employees are in the building.

3. Environment

This project will reduce the load on the existing village sewers during heavy rainfalls and help to alleviate upstream flooding which occurs from time to time now.

↑ OF THE PLANT AND THE VILLAGE,

4. Noise

Plant and community noise levels will not be affected.

III. Project Premises

A. Site Location Premises

The new sewer will run westward, roughly following the plant's 5th street from south of building BBO to the village sewer box just east of State Route 3. The new sewer will be north of the two existing village sewers.

Soil conditions vary greatly and are expected to be unstable. Most excavated soil will be unsuitable for backfill. Some soil will be chemically contaminated and must be disposed of per established plant procedures. The ground water level is high and fluctuates widely depending on types of soil encountered, the Mississippi River level and rainfall.

WCK 4084955

III. Project Premises - continued

B. Process Premises

Not applicable.

C. Ex-Project Utility Premises

Required utilities can be provided from existing plant sources.

D. Ex-Project Waste Treatment

The new plant sewer will discharge into the Sauget Village sewer system east of State Route 3, as it presently does, and be carried westward to the Sauget Physical/Chemical Treatment Plant for treatment before discharge into the Mississippi River. In the future, after primary/chemical treatment, the effluent will go to the American Bottoms Regional Treatment Facility, expected to be operational in ~~1986~~ for secondary treatment ~~x~~ in 1986.

E. Ex-Project Service Premises

No new service facilities are needed to support this project.

F. Related Projects

~~A plant project for dismantling building BI, which sits over the sewer routing, needs completion prior to start of new sewer construction.~~

~~Approval of CEA 3741, ACL waste pre-treatment is HAS BEEN APPROVED. indeterminate. The final disposition/Design of this project has a direct effect on the branch sewers and manholes required on this project (CEA 3808), or vice versa. This project takes into account current plans for CEA 3741. There is possibility of change.~~

~~WILL BE INFLUENCED BY DESIGN IN PROGRESS OR COMPLETE~~
G. Permits and License Requirements ON CEA 3741.

No discharge permits are required since the new sewer is a replacement sewer and no increase in flow or pollutant loading to the municipal system will result.

WGK 4084956

III. Project Premises - continued

Infringements of Village of Sauget right-of-ways must be negotiated with the village by the Plant.

IV. Project Risks

A. Technical Risks

Technical risks are considered minimal on the project. Design and construction will take into account experiences gained on CEA 3088 which replaced many of the main plant sewers.

B. Environmental Risks

This project is not expected to significantly change any environmental risk. This project will reduce the load on the existing Village of Sauget sewers upstream of Monsanto's discharge. Village sewer loading downstream of Monsanto's discharge will remain the same as it is now.

C. Vulnerability

This project is considered vulnerable to capital and expense deviations since deep excavations will be subject to flooding due to unpredictable weather, and high ground water levels and unstable soils. A high percentage of soil (if not all) will be unsuitable for backfill. An unknown ~~but considered large~~ quantity of soil will be chemically contaminated and will require controlled disposal. ~~In preparing the capital estimate conservative estimating factors and higher than normal contingency allowances should be considered to prevent the risk of significant cost overruns.~~ This project has been developed with consultation from Gampco (contractor for Queeny spill control project CEA 3189). However, poor soil conditions and the extent of ground water dewatering cannot be better quantified without extensive soil testing and actual dewatering tests. X

D. Likelihood of Changes in Definition

WGK 4084957

No significant changes in project definition are anticipated.

Project Strategy calls for THE TO BE LEVEL
FOR MAINTAINING GROUND WATER BELOW THE
SEWER CONSTRUCTION ELEVATIONS. CONSTRUCTION
TRADE UNIONS COULD OBJECT TO THIS STRATEGY.
COST FOR UNION LABOR TO MAN THE DEEP WELL
PUMPS, SHOULD A JURISDICTIONAL DISPUTE BESET
BY MONSANTO, IS IN THE MAGNITUDE OF \$1000K.

WHAT ARE THE RISKS
INVOLVED IN PUMP DOWNS
OF GROUND WATER
DAMAGED TO ADJACENT
STRUCTURES?

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Project Risks - continued

E. Execution Risks

Soils - A wide variety of soils are expected. Seventy-five percent of the soil is expected to be of poor quality for use as backfill. A ~~large~~ portion may be contaminated and require special handling and disposal. Excavations will be deep and require extensive shoring. Where soils are particularly unstable or excavation is adjacent to important structures, sheet piling may be required.

Ground Water - Extensive dewatering is required. Assuming ~~100'~~ ^{ALL} ~~200'~~ ^{THREE} of open ditch, ~~five~~ ^{8"} ~~8" Ø~~ wells at 50' intervals, 60" depth and pumps at 25 hp each, may be required. ~~Two men are required to man the pumps 24 hours/day.~~ Wells will have to be drilled along the entire route as construction progresses. Acidity of ground water may be high in some areas. Acid resistant pumps should be used.

The risk of subsidence exists. Test wells, or piezometers, are required to monitor and restrict draw down to a reasonable limit to protect existing structures, including the existing village sewers. Migration of contaminated water from the existing sewers is a possibility.

Acid Proof System - Integrity of the new sewer acid proof system will be the lump sum contractors risk. However, Monsanto ~~must~~ ^{IT IS MANDATORY THAT} continually inspect quality.

Underground Obstructions - Underground obstructions and utilities are apt to be encountered. A thorough drawing investigation will be conducted but the risk remains.

(DURING DESIGN)

Project Description

A. Facility Description

The new sewer will, in general, be parallel and north of the two existing village south trunk sewers. About 1660 lineal feet of 42 inch diameter main trunk sewer pipe will be required. Also, several smaller branch sewers are needed to tie into existing sewers.


WGX 4084958

V. Project Description - continued

Construction will be of extra strength vitrified clay tile encased in reinforced concrete. Joints will be made with Furan resin acid proof cement. Sewer manholes and inlet boxes will be reinforced concrete, fully lined with an acid proof system. Approximately 30 will be needed, about 18 manholes, and about 12 branch inlet boxes.

Parshall flume flow measurement and liquid sampling facilities will be provided near the point of discharge into the Sauget Village sewer system.

Design and construction will conform generally with CED Master Specification for Yard Chemical Sewers - Clay Pipe A8.2 STD 3.

 Two cross connections will be provided to allow the village to divert their flows to the new sewer while they repair their own. This also allows Monsanto to use the village sewers during emergency repairs. At the conclusion of such work the connection would be plugged off.

B. Plot Plans



Preliminary plot plans are included in Appendix A.

VI. Project Strategy

A. Design Strategy

Project design will be in-house by the MCI SPEO group. No pre-approval funding will be requested.

B. Construction, Checkout and Completion Strategy

 Construction will be via lump sum union contractors. ^{SEPARATE} BIDS WILL BE SOLICITED FOR THE WWS. SEWER CONSTRUCTION
 Winter weather will be an adverse factor. Furan WILL NOT START application is temperature sensitive. UNTIL THE WWS ARE OPERATIONAL.

W6K 4084959

VI. Project Strategy - continued

Manholes must be ^{IN} constructed around existing operating sewers. When appropriate the existing sewer is to be "broken out" of the new manhole and sewage allowed to flow through the new sewer. The old sewer connections would then be permanently plugged. Prior to any tie-in related sewers must be checked for hazardous gas and fluids. The plant ~~would~~ ^{will} be required to flush the sewers until safe to work.

Where we cannot build around an operating sewer, by-pass pumping or siphoning between existing manholes will be required.

Some areas of construction will interfere with production, especially around some loading docks. Close coordination is required between the Plant Manufacturing Representative and Construction.

In general, overtime is not required for completion of this project.

The plant will ^{ISOLATE} ~~remove~~ railroad tracks from service to allow for sewer crossings. The tracks involved can be serviced from the north end of the plant by the Terminal Railroad.

CED has existing, adequate receiving and storage capability. ~~However, sequential delivery of some items, such as VCP may be advantageous with respect to storage and each flow.~~

CED has existing, adequate temporary construction facilities. A shower trailer is available.

Extensive shoring and dewatering of excavations will be a major construction factor. ~~A substantial amount of~~ Contaminated soil is expected. Such soil must be handled per plant procedures and hauled to a licensed disposal site.

How?
Checkout (including leak testing) and start-up will be on a sequential basis. Construction will start at the Route 3 Village of Sauget collection box and proceed east. As sections are completed between major manholes they will be tested and activated. Inflatable bladders will be utilized as temporary pipe plugs.

WCK 4084960

VII. Facilities Description for Estimate, Schedule and Control

- Category 01 - ^{PLANT} Equipment Items (Lichtenheld) ^{DUPLICATED}
Existing sampling equipment will be ~~relocated~~. See
~~Category 03.~~ ^{PLANT} FURNISH (8) 25HP DEEP WELL PUMPS. STAINLESS STEEL.
- Category 02 - Instrument Items (Harber)
Existing ultrasonic flow instrumentation will be ~~relocated~~. See ~~Category 03~~.
New Parshal Flume, maximum flow 12,000 GPM. ^{MINIMUM} Accurate range 3,000 to 8,000 GPM.
DEEP WELL HIGH/LOW, STOP/START, ALARMS (8 SETS).
- Category 03 - Set & Test Equipment (Lichtenheld)
~~See Category 03~~ SET AND TEST LIQUID SAMPLER.
(8) DEEP WELL PUMPS
- Category 04 - Set & Test Instruments (Harber)
~~See Category 03~~ SET AND TEST NEW ULTRASONIC FLOW INDICATOR, RECORDER AND TOTALIZER. DEEP WELL CONTROLS.
- Category 05 - Piling (Lichtenheld)
None required.
- Category 06 - Excavation (Lichtenheld)
Excavation (for bldg. and misc.) 10 cu. yd.
Backfill, compacted 8 cu. yd.
(35) 60' DEEP WELLS
- Category 07 - Foundations (Lichtenheld)
Building slab 2 cu. yd.
- Category 08 - Supports, Platforms & Structures (Lichtenheld)
None required.
- Category 09 - Other Building Items (Lichtenheld)
1- 3' x 7' mandoor.
(2) 8" ϕ vent fans.
- Category 10 - Sprinklers and Fire Protection (Lichtenheld)
None required.
- Category 11 - Piping (Lichtenheld)
None required.
- Category 12 - Ductwork (Lichtenheld)
None required.

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VII. Facilities Description for Estimate, Schedule and Control -
 continued

Category 13 - Electrical (Harber)

1. Set 2 new poles and run about 100' of guy strand and feeder from existing meter house to new meter house for power.
2. Mount electric heater with thermostat, vent fan, new breaker panel and power for sample pump. About 50' conduit.
3. Mount 2 receptacles, 2 fluorescent fixtures, and switch for new meter house. About 50' conduit.
4. Run (2) 2" conduits underground and encased in concrete from new meter house to new manhole with flume. About 75'.

5. TEMPORARY POWER TO 35 DEEP WELLS.

Category 14 - Site Preparation (Lichtenheld)

None required.

Category 15 - Sewers, Drains, and Plumbing (Lichtenheld)

Excavation	20,000 c.y.
Backfill, compacted (in place) (75% new fill)	17,000 c.y.
3" gravel areas	260 tons
Sewers, VCP (extra strength)	
42"Ø	1,660 L.F.
24"Ø	40 L.F.
18"Ø	25 L.F.
15"Ø	235 L.F.
12"Ø	425 L.F.
8"Ø	300 L.F.
6"Ø	90 L.F.
Concrete encasement, 2 pour, reinforced per Spec. 48.2 STD 9 , Figure 5	1,660 c.y.
Concrete manholes, curb inlets, trench	630 c.y.
C.I. frames and grates, heavy duty	30 ea.
Galvanized trench grating, 1"	20 S.F.
Acid brick, for manholes, with Furan joints	11,000 S.F.
Fill 1/4" space behind acid brick with molten sulfur	
Asphalt membrane, outside surface of manholes	15,000 S.F.
Asphalt membrane, fiber reinforced	11,000 S.F.

*spec. of manhole
fill 2
fill 2
fill 2*

WCK 4084962

VII. Facilities Description for Estimate, Schedule and Control -
continued

Sewer plugs, concrete with acid brick 40 ea.
Fiberglass coating on underside of
manhole lids 900 S.F.
Sheeting, timber 20,000 S.F.
Sheet piling MP 112, 15' embedment 14,000 S.F.
Structural steel wales and struts
reuse 100' sections 8 tons
Purchase steel piling 7,600 S.F.
"Cage" sheeting 1,700 F.L.

Category 16 - Underground Piping (Lichtenheld)
None required.

Category 17 - Yards, Roads and Fencing (Lichtenheld)

Excavation 150 c.y.
Curb removal 600 L.F.
Remove existing asphalt paving 1,200 s.y.
Backfill, compacted (in place)
(75% new fill) 300 c.y.
Asphalt paving, 3" asphalt and 9" gravel 800 s.y.
Curbs, WGL std. (modified A8.3 STD 9,
Figure 3) 760 L.F.
Replace asphalt paving (road) 1,400 s.y.
Fencing, vinyl clad, with 3 strands
barb wire and 2 locked 3' gates 30 L.F.

Category 18 - Railroads (Lichtenheld)

Steel rail crossing (30 L.F. with switch) 1 ea.
Rail crossing removal (timber) 2 ea.
9' x 80 L.F.

Category 19 - Insulation - (Lichtenheld)
None required.

Category 20 - Painting - (Lichtenheld)

Paint 8 x 8 x 8 concrete block building per Monsanto
standards:
Inside - K1.3 STD. P4
Outside - K1.3 STD. P5

Category 21 - Walls, Masonry Roofs & Roofing (Lichtenheld)
8' x 8' x 8' high concrete block building with 4"
poured concrete roof.

Category 22 - Spares (Lichtenheld)
None required.

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Notes to estimator (Estock)

Categories 50, 51, 53, 55, 58 & 67 (By Murphy, Estock)
Work up from "zero base" indirects estimate.

Category 80 - Engineering
Work up from manhour and travel estimate from each discipline.

Category 81 - Outside Engineering
Provide allowance for outside consultation (Say \$20k).

Category 90 - Dismantling
Provide an allowance for unknowns. Dismantle the existing CED fab shop.

Category 91 - Sales and Use Taxes (Estock)

Category 92 - Repairs Expense
Normal allowance.

Category 93 - Relocation & Modification Expense (Harber, Lichtenheld, Estock)
Relocate existing liquid sampler.
Relocate existing flow instrumentation.
Allowance to relocate underground obstructions.

Category 94 - Startup Relocation & Modification Expense
~~Put the following in capital categories as distinct items~~

Provide allowances for plugging off sewers and pumping or siphoning around sewer sections during tie-ins.

~~Provide allowances for~~
Hydrostatic testing.

~~Provide~~
Dewatering wells and operating costs (Note: Put expected dewatering in capital category such as Category 15. Allowance for extraordinary dewatering [risk items] should have allowances in undeveloped design. This includes highly acidic pumping).

Expense - use an allowance.

MOVE TO
CAT 15

By Plant at \$100k

WGK 4084964